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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/625,410	07/23/2003	Vincent S. Chang	TSM03-0005	8144
43859	7590	07/12/2004	EXAMINER	
TAIWAN SEMICONDUCTOR MANUFACTURING CO., LTD. C/O SLATER & MATSIL, L.L.P. 17950 PRESTON ROAD, SUITE 1000 DALLAS, TX 75252			EVERHART, CARIDAD	
			ART UNIT	PAPER NUMBER
			2825	

DATE MAILED: 07/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/625,410

Applicant(s)

CHANG ET AL. *AK*

Examiner

Caridad M. Everhart

Art Unit

2825

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>7-24-2003</u> . | 6) <input type="checkbox"/> Other: ____.  |

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-6 , 8-11, 13-17, and 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Sarfaty(US 6,627,463B1).

Sarfaty discloses using spectroscopy in a plasma process (col. 1, lines 36-40) of nitriding a silicon oxide film(col. 1, lines 56-62). The plasma emits an optical spectrum(col. 3, lines 20-25), and data of wavelengths emitted is gathered by a data collector(col. 3, lines 35-40). The wavelengths collected are within the recited range(col. 5, lines 15-20). The concentration of nitrogen is monitored(col. 5, lines 65-67). The data is analyzed and used to control the process(col. 8, lines 1-14). The oxide layer processed is a gate oxide layer (col. 5, lines 53-56). The process is monitored in situ and real time(col. 8, lines 1-13), as the data is analyzed, compared to a model and used to control the process as it is proceeding. Peak intensities are used to do the analysis(Fig. 6A and col. 5, lines 54-60 and col. 6, lines 40-50). In Fig. 1 Sarfaty discloses the plasma chamber 12, means for controlling the process is disclosed in col. 8, lines 10-11 in which it is disclosed that the process is under the control of a computer processor, an optical sensor 28 is disclosed in Fig. 1 and col. 3, lines 29-30, the spectral

analyzer 22 is shown in Fig. 1, and the analysis has been indicated in the cited portions above, and the determining of the concentrations in col. 8, lines 1-14 in which the desired concentration is compared to the measured concentration in the controlling of the process by the means for carrying out these steps.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 7, 18, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sarfaty as applied to claim 1 above.

Sarfaty is silent with respect to the recited equation. Sarfaty is also silent with respect to the recited concentration and the recited thickness.

Although Sarfaty is silent with respect to the recited equation, it would have been obvious to one of ordinary skill in the art at the time of the invention to have arrived at such an equation because one of ordinary skill in the art would have been able to use the mathematical knowledge and tools available in the art to have arrived at an equation to which the data could be fitted. It would have been also within the ordinary skill in the art to have chosen the recited concentration and the recited thickness because these are variables of the art which one of ordinary skill in the art would have been able to determine. With respect to the thickness, in addition Sarfaty discloses thin gate oxides with thickness below 20 Angstroms(col. 5, lines 54-58).

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sarfaty as applied to claim 9 above, and further in view of Thakur(US 6,669,782B1). Sarfaty is silent with respect to the controlling one of the recited process variables. Thakur discloses that nitridation (col. 5, lines 38-40 and col. 11, lines 15-20) can be controlled using an in situ diagnostic (col. 9, lines 45-48) and a controller to set the process parameters(col. 10 lines 65-67 and col. 11, lines 1-3).

It would have been obvious to one of ordinary skill in the art to have combined the disclosure made by Sarfaty with the disclosure made by Thakur in order to use the data and analysis made by the process taught by Sarfaty with the control of the process parameters taught by Thakur because the in situ data and analysis taught by Sarfaty is a non-contact method and the control of the parameters would result in not having to stop the process if a fault condition is found, but rather to adjust the process, which is a

beneficial modification of the fault-condition embodiment taught by Sarfaty(col. 9, lines 1-15).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Caridad M. Everhart whose telephone number is 571-272-1892. The examiner can normally be reached on Monday through Fridays 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew S. Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
CARIDAD EVERHART  
PRIMARY EXAMINER

C. Everhart  
7-7-2004